

**Induction of the apoptosis of HL-60 leukemia cells by  
*Scytosiphon lomentaria***

Sang-Chul Kim, Soo-Young Park, Jae-Hee Hyoun, Ji-Hoon Kang, Young-Ki Lee, Deok-Bae Park, Eun-Sook Yoo, Hee- Kyoung Kang\*  
*Department of Medicine, College of Medicine, Cheju National University, Ara 1-dong, Jeju 690-756, South Korea*

The present study was taken to examine the inhibitory effect of extracts of *Scytosiphon lomentaria*, a marine alga growing in Jeju Island, on the growth of cancer cells and to develop an anti-cancer agent using components of *S. lomentaria*. The effect was observed by the measurement of metabolic activity using colorimetric 3-(4,5-dimethylthiazol)-2,5-diphenyltetrazolium bromide (MTT) assay. In results, crude extract of this alga markedly inhibited the growth of leukemia cell lines such as HL-60 and KG-1, but could scarcely inhibit the growth of normal cells (HEL299) and adenocarcinoma cells (SNU-16 and HCT-15). When HL-60 cells were treated with the extract, DNA fragmentation and the increase of proportion of sub-G1 hypodiploid cells were observed. Therefore, the inhibitory effect of *S. lomentaria* on the growth of HL-60 cells seems to arise from the induction of apoptosis. In order to understand the mechanism of apoptosis induction by *S. lomentaria*, we examined the changes of Bcl-2 and Bax expression. The extract reduced Bcl-2, an anti-apoptotic protein, but increased Bax, a pro-apoptotic protein in a dose-dependent manner. When we examined the activation of caspase-3, an effector of apoptosis, the expression of active form(19 kDa) of caspase-3 was increased and the increase of their activities was demonstrated by the cleavage of poly(ADP-ribose)polymerase, a substrate of caspase-3, to 85 kDa. The results indicate that extract of *S. lomentaria* induces the apoptosis of HL-60 cells via the down-regulation of Bcl-2 and the activation of caspases. [Supported by a grant from KRIBB-JEJU joint research program funded by Jeju Provincial Government]